CLAIMS

1. An adult multipotent human stem cell, characterized in that it has:
   i) significant telomerase activity,
   ii) an HLA Class I negative phenotype,
   iii) a normal karyotype,
   iv) a capacity to become quiescent,
   v) a capacity for self-renewal preserved for at least 130 population doublings.

2. Stem cell according to claim 1, characterized in that it has a self-renewal capacity preserved for at least 200 population doublings.

3. Stem cell according to claim 1 or claim 2, characterized in that it can be isolated from human adipose tissue.

4. Stem cell according to any one of the preceding claims, characterized in that it can differentiate into a cell of endodermal, ectodermal or mesodermal origin.

5. Stem cell according to claim 4, characterized in that it is capable of differentiating into an adipocyte, osteoblast, myocyte, chondrocyte or endothelial cell.

6. Stem cell according to any one of the preceding claims, characterized in that it has a telomerase activity corresponding to at least 20% of the telomerase activity of a reference cell line.

7. Stem cell according to any one of the preceding claims, characterized in that it expresses the transcription factor Oct-4 and/or Rex-1.

8. Stem cell according to any one of the preceding claims, characterized in that it can express at least one transgene.

9. Cell population comprising a plurality of cells according to any one of claims 1 or 51 to 54, characterized in that it is free of adipocytes, fibroblasts, preadipocytes, endothelial cells, pericytes, mastocytes, and smooth muscle cells.

10. Cell population according to claim 9, characterized in that it is clonal.

11. Cell population according to any one of claims 9 or claim 10, characterized in that it becomes quiescent after about 60 population doublings.

12. Cell population according to claim 11, characterized in that it is capable of proliferating in the presence of growth factors such as basic fibroblast growth factor (bFGF), PDGF, EGF, NGF, SCF.

13. A method for obtaining multipotent human stem cells comprising the following steps:
- culturing cells from a human tissue sample, in particular human adipose tissue,
- selecting two cell sub-populations termed a "CA" population and "CS" population, the "CA" population having an adhesion rate of less than 12 hours, and the "CS" population having an adhesion rate of more than 12 hours,
- enriching the "CA" population until a quiescent cell population is obtained,
- inducing proliferation of stem cells of the "CA" population.

14. A method according to claim 13, comprising the following steps:
a) enzymatic digestion of a sample of adipose tissue ;
b) recovering a cell fraction that is free of adipocytes, containing all of the cell types present in the preparation obtained in (a) with the exception of adipocytes;
c) carrying out in vitro culture of the cell fraction obtained in step (b) for at least 12 hours;
d) selecting two cell sub-populations, "CA" and "CS";
e) enriching population "CA" until a population of cells is obtained that is capable of entering a quiescent state ,
f) optionally, inducing proliferation of stem cells of population"CA".

15. A method according to claim 13 or claim 14, characterized in that the adipose tissue sample derives from a healthy child under 10 years of age.

16. A method according to any one of claims 13 to 15, characterized in that the adipose tissue sample is a sample of extramedullary tissue derived, for example, from the umbilical region or from the pubic region or from the inguinal region or from the perineal region or from the abdominal region or from the subcutaneous region.

17. Method according to claim 13 or claim 14, characterized in that the proliferation induced in step (f) is an intensive proliferation induced by adding a growth factor.

18. Method according to claim 14, characterized in that enzymatic digestion in step (a) is carried out by bringing the adipose tissue sample into contact with a collagenase preparation for a maximum period of 10 minutes.

19. Method according to claim 14, characterized in that the cell fraction that is free of adipocytes is obtained by carrying out an adipocyte elimination step, for example by centrifugation.

20. Method according to claim 14, characterized in that the cell fraction that is cultured in step (c) does not undergo any filtration steps before culturing.

21. Method according to claim 14, characterized in that the culture step (c) is carried out in a culture medium supplemented with foetal calf serum without the addition of other growth factors.

22. Method according to claim 14, characterized in that during culture step (e), cell transfer is carried out when the cells reach 80% confluence, transfer being carried out at a seeding density of about 1000 to 3500 cells/cm^2.

23. Method according to claim 13 or claim 14, characterized in that the "CA" population becomes quiescent after about 60 population doublings.

24. Method according to claim 15, characterized in that the growth factor employed during step (f) is selected from bFGF, PDGF, EGF, NGF and SCF.

25. Stem cells obtainable by carrying out the method according to any one of claims 13 to 24.

26. Stem cells according to any one of claims 1 to 12 or 25, for use in therapy.

27. Stem cells according to claim 26, characterized in that the therapy comprises transplantation of cells into an individual followed by cell differentiation and tissue regeneration in vivo.

28. Stem cells according to claim 26, characterized in that transplantation is allogenic.

29. Use of a cell according to any one of claims 1 to 8 or 25, or a cell population according to any one of claims 9 to 12, for the production of a therapeutic product for in vivo tissue regeneration.

30. Use according to claim 29, characterized in that the tissue is bone tissue.

31. Use according to claim 29, characterized in that the tissue is adipose tissue.

32. Use according to claim 29, characterized in that the tissue is a muscle or endothelial tissue.

33. A method for producing differentiated cells of the mesodermal lineage, characterized in that stem cells according to any one of claims 1 to 13 or 25 are cultivated from confluence in the presence of a differentiation medium.

34. Method according to claim 33, characterized in that the stem cells are seeded at a density of about 10 000 to 25 000 cells/cm^2.

35. Method according to claim 33 or claim 34, characterized in that the culture medium is a medium allowing differentiation into adipocytes.

36. Method according to claim 33 or claim 34, characterized in that the culture medium is a medium allowing differentiation into osteoblasts.

37. Method according to claim 33 or claim 34, characterized in that the culture medium is a medium allowing differentiation into myocytes, or an angiogenic medium.

38. A screening method to identify agents that can modulate the differentiation of cells into cells of the mesodermal lineage, characterized by :

a) culturing stem cells according to any one of cliams 1 to 13 or 25 under conditions that allow their differentiation into cells of the mesodermal lineage, in the presence of a candidate agent;

b) comparing the differentiation of cells in the presence of a candidate agent with differentiation in the absence of the candidate agent.

39. Method according to claim 38, characterized in that the culture conditions allow differentiation into adipocytes.

40. Method according to claim 38, characterized in that the culture conditions allow differentiation into osteoblasts.

41. Method according to claim 38, characterized in that the culture conditions allow differentiation into myocytes.

42. Method according to claim 38, characterized in that the agent that can modulate differentiation is an anti-differentiation substance.

43. A screening method for identifying agents that may have a lipolytic activity, characterized by :

a) culturing stem cells according to any one of claims 1 to 13 or 25 under conditions allowing their differentiation into adipocytes,
b) bringing the adipocytes thus obtained into contact with a candidate agent,
c) evaluating the lipolytic activity of the candidate agent.

44. A screening method for identifying agents that may have an anti-lipolytic activity, characterized by :
a) culturing stem cells according to any one of claims 1 to 13 or 25 under conditions allowing their differentiation into adipocytes,
b) bringing the adipocytes thus obtained into contact with a candidate agent, in the presence of a lipolytic agent,
c) evaluating the anti-lipolytic activity of the candidate agent.

45. A screening method for identifying agents that may have an insuline-sensitizing activity, characterized by :
a) culturing stem cells according to any one of claims 1 to 13 or 25 under conditions allowing their differentiation into adipocytes,
b) bringing the adipocytes obtained into contact with a candidate agent,
c) evaluating the insuline-sensitizing activity of the candidate agent.

46. Use of stem cells according to any one of claims 1 to 13 or 25 in cosmetics.

47. A cosmetic composition comprising a plurality of cells according to any one of claims 1 to 13 or 25, in association with an excipient, vehicle, solvent, colorant, fragrance, antibiotic or other additives acceptable in cosmetic products.

48. A pharmaceutical composition comprising a plurality of cells according to any one of claims 1 to 13 or 25, in association wtih a physiologically acceptable excipient.

49. An adult multipotent human cell, termed a "CS" cell, characterized in that

i) it has an HLA Class I negative phenotype,
ii) it has a normal karyotype,
iii) it has a self-renewal capacity that is preserved for about 40 to 60 population doublings,
iv) it is not capable of becoming quiescent,
v) its proliferation rate is not affected by LIF.

50. A multipotent human cell population termed a "CS" population comprising a plurality of cells according to claim 49.

51. Stem cell according to any one of claims 1 to 8, characterized in that it has the following phenotype:
HLA class I negative;
HLA class II negative;
CD3 negative;
CD13 positive;

52. Stem cell according to any one of claims 1 to 8 or 51, characterized in that it has a CD13 positive phenotype in the presence of 10% foetal calf serum.

53. An adult multipotent human stem cell, characterized in that after reaching quiescence, it stably exhibits the following phenotype in vitro:
HLA class I negative,
HLA class II negative,
CD3 negative,
CD13 positive,
LIF-R negative,
Oct-4 positive,
Rex-1 positive,
ABCG2 positive,
and in that it has a normal karyotype and significant telomerase activity.

54. Cell according to claim 53, characterized in that it has immunoprivileged behavior in vivo and a capacity to migrate in the undifferentiated state.